CLAIMS

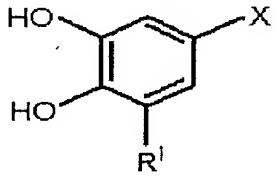
1 Synthetic vegetal melanins obtainable by in vitro polymerization of at least one monomer unit (a), and optionally at least one compound (b), wherein.

(a) is a plant polyphenol; and

(b) is an eumelanin precursors;

said synthetic vegetal melanin being characterized by a Red.Green Blue ratio comprised between 1 . 0.88 . 0.84 and 1 . 0.64 . 0.41.

2 Synthetic vegetal melanins according to claim 1, wherein the plant polyphenol is a vegetal substance of formula (I).

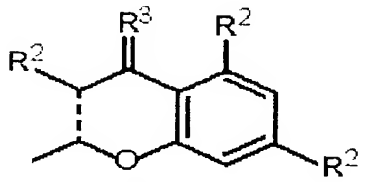


(I)

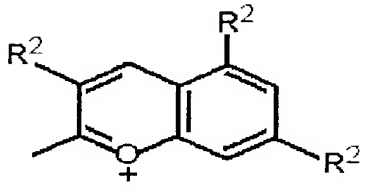
wherein:

R^1 represents hydrogen, hydroxy, or methoxy group; and

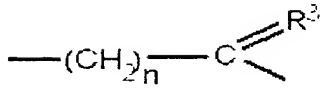
X represents a residue of formulas (II), (III) or (IV)



(II)



(III)



(IV)

wherein.

n is 0,1 or 2;

R^2 represent, each independently, hydrogen, hydroxy, methoxy, or an O-glycosilated group,

R^3 . represents, one oxygen, two hydrogen atoms, or one hydrogen and one hydroxy group, and

the phantom line between C_2 -C_3 represents a double or a single bond,

as well as salts, esters and solvates thereof.

3 Synthetic vegetal melanins according to claims 1 to 2, wherein the plant

polyphenol of formula (I) with X being a residue of formula (II) is a flavonoid selected in the group consisting in quercetin, fisetin, fustin, luteolin, OPC, catechin, epicatechin, GC, GCG, EGC, EGCG, myricetin, dihydroquercetin and mixture thereof.

4 Synthetic vegetal melanins according to claims 1 to 2, wherein the plant polyphenol of formula (I) with X being a residue of formula (III) is a flavonoid anthocyanins selected in the group consisting in cyanidin, delphinidin and mixture thereof.

5 Synthetic vegetal melanins according to claims 1 to 2, wherein the plant polyphenol of formula (I) with X being a residue of formula (IV) is an open ring dihydroxyphenol selected in the group consisting in hydroxytyrosol, protocathechuic acid, protocathechuic aldehyde, gallic acid, tannic acid and mixture thereof

6 Synthetic vegetal melanins according to claims 1 to 2, wherein the eumelanin precursor is selected in the group consisting in L-dopa, DHI, DHICA, dopamine, pyrocatechol, pyrogallol and mixture thereof.

7 Method of producing synthetic vegetal melanins according to claims 1 to 6 comprising bubbling air or oxygen through an alkaline aqueous solution of the monomers at pH 10 or higher, during 12 to 48 hours, at a temperature ranging from 10 to 90°C.

8 Method of claim 7, further comprising catalytic amounts of pro-oxidant metals selected in the group consisting in Cu^{++}, Fe^{++}, Ni^{++}, Co^{++} and mixture thereof

9 Method of claim 7 where the chemical oxidizing agent is selected in the group consisting in hydrogen peroxide, hydrogen iodide, ammonium persulfate, potassium permanganate, magnesium perchlorate and mixture thereof

10 Method of producing synthetic vegetal melanins according to claim 1 to 6 comprising bubbling air or oxygen through an buffered aqueous solution of the monomers at pH from 9.5 to 4.5, during 12 to 48 hours, at a temperature ranging from 20 to 45°C in presence of a suitable enzyme.

11\. Method of claim 10, wherein the enzyme is selected in the group consisting in tyrosinases, polyphenoloxidases (catachol oxidases), phenolases,

(phenoloxidases), peroxidases, laccases, lypoxygenase, and mixture thereof

12 Method according to claims 10 to12 wherein the monomer units (a) or (b) are formed in situ from the pre-momomers, bearing a monophenolic moiety

13. Method of claim 12 where the pre-momomers are selected in the group consisting in dihydrokaempferol, armadendrin, p-hydroxybenzaldehyde, PHBA, tyrosol, p-coumaric acid, apigenin, kaempferol, pelargonin, genistein, tyrosine, tyramine, 5-hydroxy-indole and mixture thereof.

14. Cosmetic composition comprising as active ingredient at least one synthetic vegetal melanins according to claims 1 to 6.

15. Cosmetic composition according to claim 14, for facial make-up, hair dyes, tanning, anti-sun, toiletry, moisturizing and protecting skin.

16. Pharmaceutical or nutritional composition having anti-inflammatory and immunomodulation activity which comprises as active ingredient at least a synthetic vegetal melanin according to claims 1 to 6.